

Engineering Division  
W/OSO321:FJZ

NOAA WIND PROFILER MODIFICATION NOTE 6  
(for Electronics Technicians)

SUBJECT : Installation, RF Gain Adjustment, and Sensitivity Time Control (STC) Alignment of Type 2 Receivers.

PURPOSE : Replacement of the Type 1 receiver

EQUIPMENT AFFECTED : All 404 MHZ wind profilers.

SITES AFFECTED : See affectivity list on page 10 of this maintenance note.

PARTS REQUIRED : Type 2 Receiver with alignment tool.

MODIFICATION PROCUREMENT : Each station will receive the required parts. No technician action required.

REQUIRED TOOLS AND TEST EQUIPMENT : 5/16 in. open-end wrench  
#2 Phillips head screwdriver  
Flat blade (3/16 in.) screwdriver  
Flat blade (1/8 in.) screwdriver  
60-100 MHz Oscilloscope  
Alignment tool (tweezer)  
SMA (M) to BNC (F) adaptor  
6 ft. RG-58 cable, BNC(M)-(M)  
50  $\Omega$  Load

TIME REQUIRED : 5 work hours, plus travel

EFFECT ON OTHER INSTRUCTIONS : None. File this note in EHB-9

VERIFICATION STATEMENT : This modification was tested at the wind profiler site in Platteville, CO.

GENERAL

This modification note contains instructions for the replacement of the Type 1 receiver for the 404 MHZ wind profiler system. Additionally, this modification note provides alignment procedures for the receiver gain adjustment and the STC circuit.

EHB-9  
Issuance 96-4  
6/17/96

#### A. Type 1 Receiver Removal Procedure

### CAUTION

**Power to the PA cabinet should always be turned off before any other equipment cabinet is powered down.**

1. Locate the circuit breaker panel on the wall next to the GOES cabinet and power-down the profiler by turning **OFF** the circuit breakers in the following order:
  - a. Breaker 17/19 (Transmitter Cabinet)
  - b. Breaker 22 (Equipment Cabinet), and
  - c. Breaker 24 (Data Processor).
2. Remove the side panel from the beam steering unit (BSU) cabinet.
3. Disconnect the coaxial cables from connectors J2 (*LO*) and J4 (*COHO*) on the rear panel of the Type 1 receiver.
4. Disconnect the cables from connectors J5 (*control*) and J3 (*output*) on the rear panel of the Type 1 receiver.
5. Disconnect the coaxial cable from connector J1 (*RF Input*) on the rear panel of the Type 1 receiver.
6. Disconnect the power cable from connector J8 (*Power In*) on the rear panel of the Type 1 receiver.
7. Remove the four mounting screws from the front panel of the Type 1 receiver and slide the unit out the front of the BSU cabinet.

#### B. Type 2 Receiver Installation Procedure

1. Install the Type 2 receiver in the BSU cabinet and secure the four mounting screws on the front panel.
2. Attach the adaptor cable (W27), supplied with the Type 2 receiver, to the power cable (cable previously connected to J6).
3. Reconnect the interface cables to connectors J2, J3, J4, J5, and J8 on the rear panel of the receiver (Figure 1).

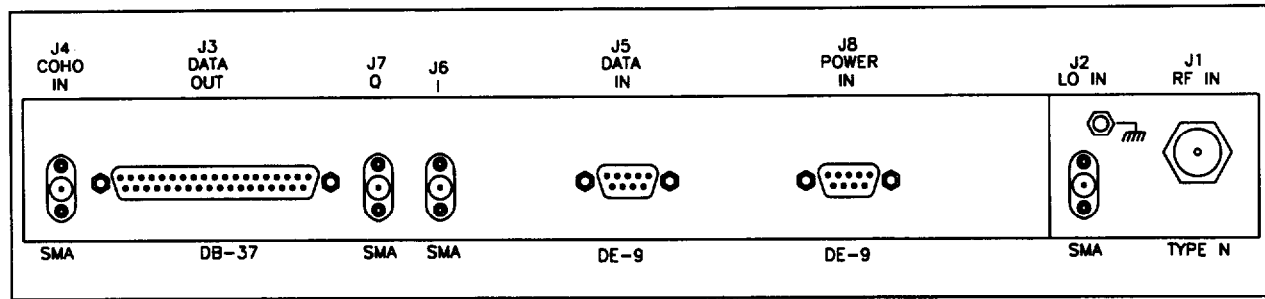


Figure 1 Type 2 Receiver Rear Panel

### C. Receiver Noise Measurement Procedure

Use the profiler to measure the system noise level as a method of calibrating the receiver gain. A  $50\ \Omega$  load is used to terminate the input of the receiver (J1) to isolate it from any external noise sources. During this test, the profiler should be cycling normally in the operational mode. The profiler maintenance terminal (PMT) is used to display the value of the system noise.

1. Attach a  $50\ \Omega$  terminator load to connector J1 (RF IN) on the rear panel of the receiver.
2. Power-up the profiler by turning **ON** the circuit breakers in the following order:
  - a. Breaker 24 (Data Processor)
  - b. Breaker 22 (Equipment Cabinet)
  - c. Breaker 19 (Transmitter Cabinet)

## NOTE

When the radar is powered up, it is sometimes necessary to reset the power amplifier RF driver (*Driver Reset* button on the AMP local monitor) to “Driver A”. The RF driver can only be reset if the RF input LED on the AMP local monitor front panel is red (indicating the system is not transmitting). The driver can be reset immediately after turning ON the PA cabinet breaker (breaker #17 and #19).

3. Connect the PMT interface cable to the front panel of the status monitor, and power-up the PMT (laptop computer).

- ```

PMT Simulator
3 Waiting for system mode response from WPS      Operational
4 Waiting for system mode response from WPS
5 WPS-234, PASSWORD REQUIRED

System Status Data Block

Mode: 03 Submode: 01 Length: 0035 Checksum: 24D8

PA Foward Power:10.00 System Noise: 65.1
Antenna Power - Forward: 77 Reflected: 004
Miscellaneous Status: 00000000
LRU Byte 1:1010101 Byte 2: 00000000 Byte 3:0000111 Byte 4:00000000
Failed PA mod: 0 Driver: 0 Failed PS: 0 Failed Quad fans: 0 Dr. fan UP
Transmitted Power:37.50 AC Line Voltage - Low: 228 High: 246
Driver Output Power: 119 Current AC Line Voltage: 236
Shelter Status Byte 1: 00000000 Byte 2: 00000000
Temperature (Deg. C):- Inside:20.83 Outside 17.08
Status of - Exciter: 00000000 Power Supplies: 00000000 Antenna: 00000000
Online Test Status: 00000000
Goes Error Codes - Byte 1: 00000000 Byte 2: 00000000
Message Status - Good Msgs: 00
Messages with Comm Errors: 00 Msgs with Content Errors: 00
Last Failure Date:
Error Code: 00 Amplification Count: 00

1 Prev 2 3 4 5 6 7 8 Prev Next
9Screen 0Screen

```

6. Locate the *System Noise* field on the PMT screen. This number should be  $63 \pm 1$  with J1 (*RF IN*) terminated. To assure repeatability of the system noise value, allow the radar to cycle through the beams several times. Press *F1* on the PMT each time the east beam is reached. Select *Status Data* again and check the System Noise.

If the system noise is  $63 \pm 1$ , no adjustment is required. Proceed to the STC alignment procedure in Section E. If the system noise value is too high or too low, proceed to the receiver gain adjustment in Section D.

#### D. Receiver Gain Adjustment.

The receiver gain is changed by adjusting a potentiometer (pot) that is accessed by removing a port-screw, labeled *RF GAIN*, from the top panel of the receiver. The pot is a surface mount device and is very small (the screw in the pot is about the size of a pinhead). **A special alignment tool is provided with the Type 2 receiver for adjusting these pots and should always be kept at the site.**

1. Remove the blank panel above the receiver. This will allow easier access to the gain adjustment pot.
2. Remove the port-screw from the top of the receiver labeled RF GAIN and carefully insert the alignment tool in the hole as shown in Figure 3. Since the pot is not visible, it is necessary to rely on the “feel” to seat the alignment tool in the potentiometer screw head.

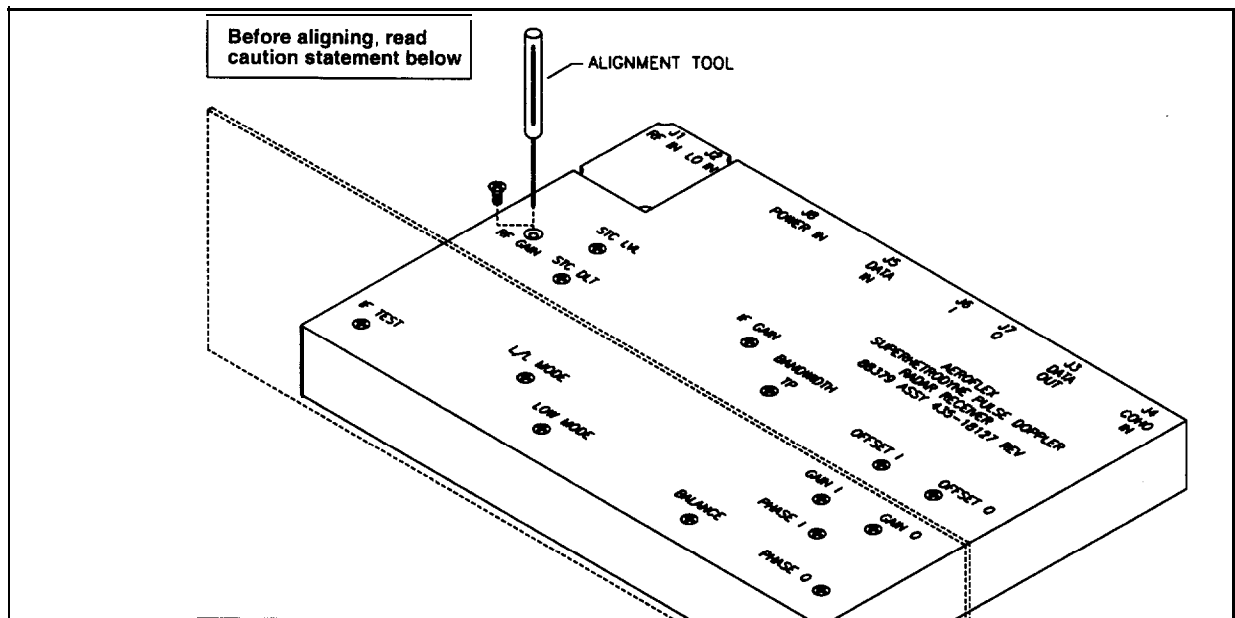


Figure 3 Receiver Gain Adjustment

## CAUTION

Considerable care must be taken when making adjustments on this pot. Rotations of just a few degrees will cause significant changes to the receiver's gain.

3. Make small changes on the *RF GAIN* pot. Wait for the radar to cycle to the east beam and use the PMT to verify the system noise as described in Section 5. Repeat this process until the system noise value of  $63 \pm 1$  is obtained. Once this value is reached, verify consistency of the system noise value by checking several more continuous beam cycles.
4. Replace the *RF GAIN* port-screw on the receiver top panel.
5. Power-down the radar as described in Section A, step 1.
6. Remove the  $50\ \Omega$  load from J1 (*RF IN*) and reconnect the coaxial cable between J1 on the receiver and the T/R switch.

#### E. STC Alignment Procedure

The STC circuit is used to attenuate atmospheric signal returns that can saturate the input amplifier of the receiver (in the three lowest range gates of the low mode). Receiver saturation causes a bias in the true atmospheric signal and can thus bias the wind measurements produced by the profiler.

The STC Alignment procedure requires an oscilloscope to monitor the waveform present at J6 (*/n-phase*) or J7 (*Quadrature*) on the rear panel of the receiver. Oscilloscope triggering is obtained from one of the T/R switch gating pulses. The alignment procedure is performed when the radar is cycling normally in operational mode during any of the three low modes.

1. Power-down the radar as described in section A, step 1.
2. Remove the four mounting screws from the front panel of the signal processor and pull the unit to its full out position. Remove the top cover panel from the signal processor.
3. Connect a probe to channel one of the oscilloscope. Unscrew the grabber-tip from the probe to expose the pointed tip. Locate J3 pin 2 inside the rear panel of the signal processor. Insert the scope probe into pin 2 of connector J3 as shown in Figure 4.
4. Screw an SMA to BNC adaptor onto connector J6 (*/n-phase*) or J7 (*Quadrature*) on the rear panel of the receiver. Connect a coax cable (with BNC connectors on both ends of the cable) between channel two of the oscilloscope and J6 (*/n-phase*) or J7 (*Quadrature*) output on the rear panel of the receiver
5. Oscilloscope Settings:

*Time/Division* =  $5\ \mu\text{Sec}$

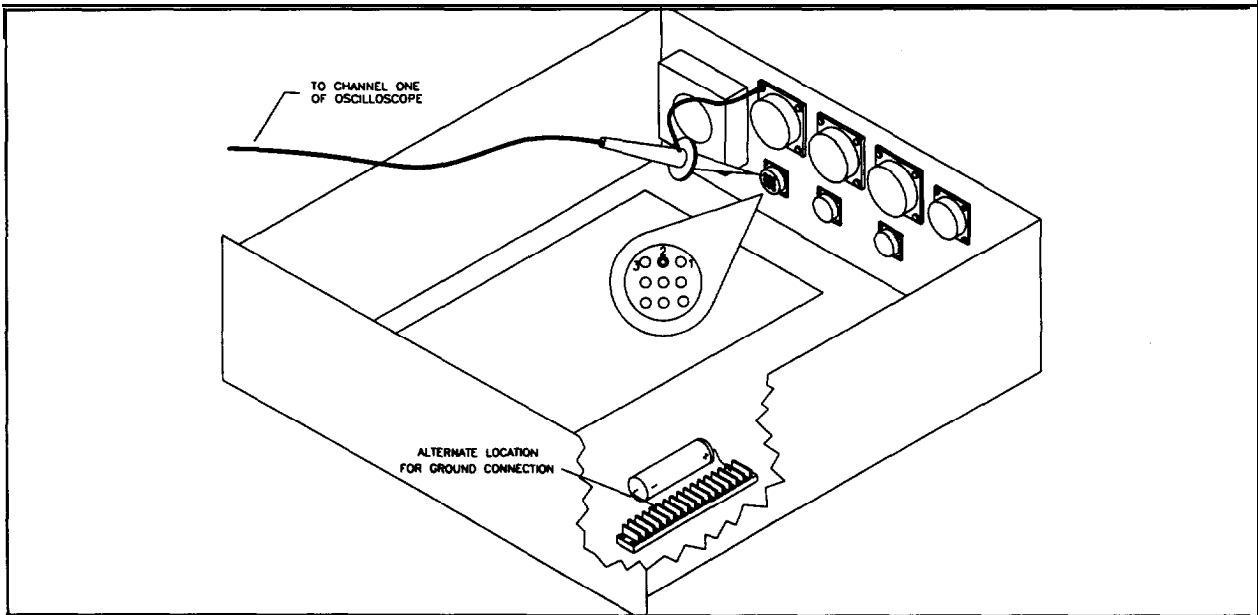
*Channel One:*

Triggering on channel one = positive edge

Volts/Division = 2 (0.2 for X10 probe)

*Channel Two:*

Volts/Division = 200 mV

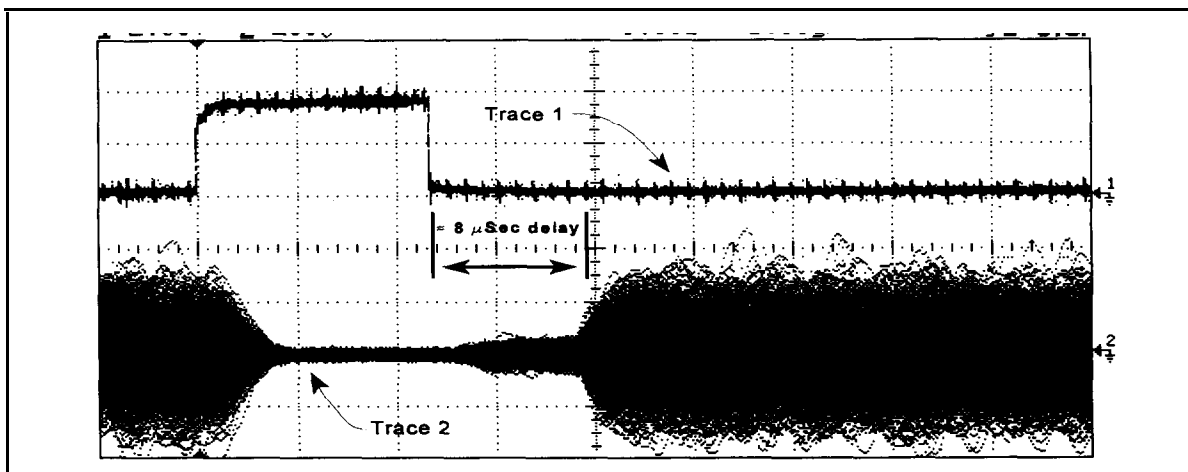


**Figure 4 Accessing the T/R Switch Trigger Pulse Inside the Signal Processor for the STC Alignment Procedure.**

6. Remove the two screws from the STC LVL (level) and STC DLT (delay) ports on top of the receiver. Refer to Figure 3.
7. Power-up the radar in the sequence as described in section C, step 2.
8. The oscilloscope will display waveforms similar to those shown in Figure 5. This figure shows the entire T/R pulse in reference to the receiver's video signal waveform. The STC circuitry is factory preset for  $\approx 8 \mu\text{Sec}$  delay (measured from the falling edge of trace 1) and an attenuation level of 15 dB ( $\approx 300 \text{ mV p-p}$ ). These settings must be fine-tuned on a site-by-site basis to achieve the maximum benefit from the STC circuit.

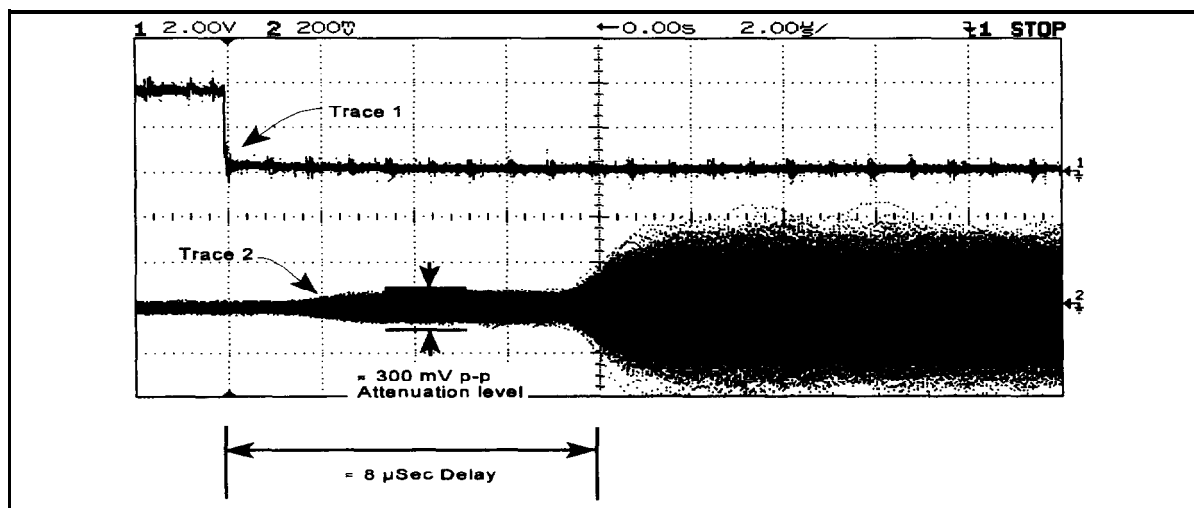
## NOTE

If problems arise when fine tuning the level and delay settings of the STC circuitry, call the Profiler Control Center (PCC) for technical assistance at (303)497-6033.



**Figure 5** Typical STC waveform on an oscilloscope. Top trace is the T/R switch gating signal. Bottom trace is the video signal present at J6 (I) or J7 (Q) output of the receiver.

9. Change the oscilloscope settings to 2  $\mu$  Sec/division, and trigger on the negative going edge of trace 1. This will provide greater resolution on the oscilloscope screen. Figure 6 shows the negative going edge of the T/R switch gating signal (top trace) and the effect of the STC circuit on the waveform (bottom trace). The STC is triggered on the negative edge of the T/R gating signal. The duration of the clamp is set by adjusting the *STC DLT*. The amplitude of the clamp is set by *STC LVL*.



**Figure 6** Effects of changing the STC DLT and *STC LVL*. Top trace is the T/R Switch Gating Pulse. Bottom trace is the Video Signal present at J6 (I) or J7 (Q) output of the Receiver.

## CAUTION

Care must be taken when making adjustments to the *STC DLT* and *STC LVL* pots. They are extremely delicate. Do not attempt to adjust these pots without an oscilloscope.

10. To adjust the *STC Level*, carefully insert the alignment tool into the *STC LVL* port on top of the receiver (see Figure 3).

Rotate **cw** to **increase** the level.  
Rotate **ccw** to **decrease** the level.

11. To adjust the *STC Delay*, carefully insert the alignment tool into the *STC DLT* port on top of the receiver (see Figure 3).

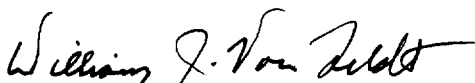
Rotate **cw** to **decrease** the delay  
Rotate **ccw** to **increase** the delay

12. Reinstall the two port screws removed from the *STC DLT* and *STC LVL* on top of the receiver.

13. Reinstall the blank panel above the receiver front panel, and reinstall the BSU cabinet side panel.

## REPORTING MODIFICATION

Target date for reporting this modification is 30 days after receipt of this modification note and parts. Report completed modification on WS Form A-26, Maintenance Record, according to instructions in EHB-4, part 2, using reporting code PROF (Figure 7).



Acting Chief, Engineering Division

Attachment

# SITES AFFECTED

| HUD ID | STATION ID | LOCATION                     |
|--------|------------|------------------------------|
| ABQ    | AZCN5      | Aztec,NM                     |
| AMA    | TCUN5      | Tucumcari,NM                 |
| FWD    | PATT2      | Palestine,TX                 |
| LUB    | JTNT2      | Jayton,TX                    |
| MEG    | OKLM6      | Okolona,MS                   |
| OUN    | LMNO2      | Lamont,OK                    |
| OUN    | PRCO2      | Purcell,OK                   |
| OUN    | VCIO2      | Vici,OK                      |
| SHV    | DQUA4      | Dequeen,AR                   |
| SHV    | WNFL1      | Winnfield,LA                 |
| TSA    | HKLO2      | Morris(Haskell),OK           |
| ARX    | BLRW3      | BlueRiver,WI                 |
| CYS    | MBWW4      | MedicineBow,WY               |
| DDC    | HVLK1      | Haviland,KS                  |
| DMX    | SLAI4      | Slater,IA                    |
| DNR    | PLVC2      | Platteville,CO               |
| EAX    | LTHM7      | Lathrop,MO                   |
| GLD    | RWDN1      | McCook,NE                    |
| ICT    | HBRK1      | Hillsboro,KS                 |
| ICT    | NDSK1      | Neodesha,KS                  |
| ILX    | WNCI2      | Winchester,IL                |
| LBF    | MRRN1      | Merriman,NE                  |
| MPX    | WDLM5      | Wood Lake,MN                 |
| OAX    | FBYN1      | Fairbury,NE                  |
| OAX    | NLGN1      | Neligh,NE                    |
| PAH    | BLMN7      | Bloomfield,MO                |
| PUB    | GDAC2      | Granada,CO                   |
| SGF    | CNWM7      | Conway,MO                    |
| AETA2  | HMRA2      | Homer,AK                     |
| VBGC1  | VBGC1      | Vandenberg AFB,CA            |
| WSMN5  | WSMN5      | White Sands Missile Range,NM |

|                                                             |        |                                                                                                      |                                             |                                   |                                                                                                                                                                                |                                                                                                             |                                   |                                       |                            |
|-------------------------------------------------------------|--------|------------------------------------------------------------------------------------------------------|---------------------------------------------|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|-----------------------------------|---------------------------------------|----------------------------|
| WS HQ USE ONLY                                              |        | WS FORM A-26 (4/94)<br><small>Supersedes WS Form A-23 and WS Form 11-28, which are obsolete.</small> |                                             |                                   |                                                                                                                                                                                | U.S. DEPARTMENT OF COMMERCE<br>NATIONAL OCEANOIC AND ATMOSPHERIC ADMINISTRATION<br>NATIONAL WEATHER SERVICE |                                   | Document Number<br><br><b>G 49978</b> |                            |
| <b>General Information</b>                                  |        | 1. Open Date<br><b>05 / 02 / 96</b>                                                                  | Time<br><b>0900</b>                         | 2. Initials<br><b>FJZ</b>         | 3. Response Priority (check one)<br><input type="radio"/> Immediate <input type="radio"/> Low<br><input type="radio"/> Routine <input checked="" type="radio"/> Not Applicable |                                                                                                             |                                   | 4. Close Date<br><b>05 / 02 / 96</b>  | Time<br><b>1100</b>        |
| 5. Description<br><b>Replacement of the Type 1 receiver</b> |        |                                                                                                      |                                             |                                   |                                                                                                                                                                                |                                                                                                             |                                   |                                       |                            |
| <b>Equipment Information</b>                                |        | 6. Station ID<br><b>JTNT2</b>                                                                        | 7. Equipment Code<br><b>PROF</b>            | 8. Serial Number<br><b>018</b>    |                                                                                                                                                                                | 9. TM<br><b>M</b>                                                                                           | 10. AT<br><b>M</b>                | 11. How Mal.<br><b>999</b>            |                            |
| 12. EQUIPMENT OPERATIONAL STATUS TIMES                      |        | a. Fully Operational<br><div></div>                                                                  | b. Logistics Delay<br><div></div>           | Parity Operational<br><div></div> |                                                                                                                                                                                | c. All Other<br><div></div>                                                                                 | d. Logistics Delay<br><div></div> | Not Operational<br><div></div>        |                            |
|                                                             |        |                                                                                                      |                                             |                                   |                                                                                                                                                                                |                                                                                                             | <b>05:30</b>                      |                                       |                            |
| <b>13. Parts Failure Information</b>                        |        |                                                                                                      |                                             |                                   |                                                                                                                                                                                |                                                                                                             |                                   | <b>14. Work Load Information</b>      |                            |
| Block #                                                     | a. ASN | b. NSN                                                                                               | c. TM                                       | d. AT                             | e. How Mal.                                                                                                                                                                    | f. Qty.                                                                                                     | g. Maint. Hrs.                    | Type                                  | Staff Hrs.                 |
| 1                                                           |        |                                                                                                      |                                             |                                   |                                                                                                                                                                                |                                                                                                             |                                   | a. Routine                            |                            |
| 2                                                           |        |                                                                                                      |                                             |                                   |                                                                                                                                                                                |                                                                                                             |                                   | b. Non-routine                        |                            |
| 3                                                           |        |                                                                                                      |                                             |                                   |                                                                                                                                                                                |                                                                                                             |                                   | c. Travel                             | <b>03:00</b>               |
| 4                                                           |        |                                                                                                      |                                             |                                   |                                                                                                                                                                                |                                                                                                             |                                   | d. Misc.                              | <b>02:00</b>               |
| 5                                                           |        |                                                                                                      |                                             |                                   |                                                                                                                                                                                |                                                                                                             |                                   | e. Overtime                           |                            |
| <b>Miscellaneous Information</b>                            |        | 15. Maintenance Comments<br><b>Replaced receiver and adjusted in accordance with mod note 6</b>      |                                             |                                   |                                                                                                                                                                                |                                                                                                             |                                   |                                       | 16. Initials<br><b>FJZ</b> |
| 17. SPECIAL PURPOSE REPORTING                               |        | a. Mod. No.<br><b>6</b>                                                                              | b. Mod./Act./Desct. Date<br><b>05/02/96</b> | c.                                |                                                                                                                                                                                | d.                                                                                                          |                                   | e.                                    |                            |
| 18. CONFIGURATION MGMT. REPORTING (use as directed)         |        | a. Block #                                                                                           | b. Manufacturer's Part No. of New Part      |                                   |                                                                                                                                                                                |                                                                                                             |                                   | c. Revision No. of New Part           |                            |

**Figure 7**  
**A-26 Form**

|                             |                            |
|-----------------------------|----------------------------|
| <i>Issue Date</i><br>2/1/96 | <i>Org.Code</i><br>W/OSO32 |
|-----------------------------|----------------------------|

# NATIONAL WEATHER SERVICE

## Engineering Handbook

|                         |                   |                       |
|-------------------------|-------------------|-----------------------|
| <i>Program</i><br>EHB-9 | <i>Part</i><br>03 | <i>Section</i><br>3.6 |
|-------------------------|-------------------|-----------------------|

### MODIFICATION NOTE INDEX

#### M003 MICROCOMPUTER SYSTEM

| Number | <u>Date of Issue</u> | Title                                                   |
|--------|----------------------|---------------------------------------------------------|
| 2      | October 25, 1989     | M003 Micro-ART Implementation                           |
|        | November 27, 1989    | Addendum to Modification Note 2 - Modem Switch Settings |
| 3      | June 15, 1990        | SixPakPlus Multifunction Board Installation             |
| 4      | December 14, 1995    | SPU 11 Vaisala Sounding Processor Board Installation    |

Item 1 has been deleted.



**U.S. DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
NATIONAL WEATHER SERVICE  
Silver Spring, Md. 20910

MEMORANDUM FOR: All NWS Regional Headquarters, Regional Maintenance Specialists, Electronic Systems Analysts, and Electronics Technicians [Engineering Handbook (EHB)-9 distribution]

FROM:

W/OPS1

John McNulty

SUBJECT:

Transmittal Memorandum for EHB-9 Issuance 01-05

1. Material Transmitted:

Engineering Handbook No. 9 (EHB-9), M003 Microcomputer System, Section 3.6, M003 Microcomputer System Modification Note 5, (for Electronics Technicians).

2. Summary:

M003 Microcomputer System Modification Note 5 provides 5.25 inch floppy drive installation instructions into a local office computer.

3. Effect on Other Instructions:

None.

Distribution:

